

**Before the
Federal Communications Commission
Washington, DC 20554**

In the Matter of)

Inquiry Regarding Carrier)
Current Systems including)
Broadband over Power Line Systems)

ET Docket No. 03-104

Amendment of Part 15 regarding)
new requirements and measurement)
guidelines for Access Broadband)
over Power Line Systems".)

ET Docket No. 04-37

By: Michael C. Tope)
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To: The Office of Engineering and Technology

Comments of Michael C. Tope

1.) Michael C. Tope respectfully submits these comments in the matter of the Notice of Proposed Rulemaking (NPRM) ET Docket No. 04-37, "Amendment of Part 15 regarding new requirements and measurement guidelines for Access Broadband over Power Line Systems".

A. Introduction

2.) As a federally licensed amateur radio operator and a practicing electrical engineer, I am very concerned about the interference potential of BPL

technology. Despite claims by BPL advocates that there will be no interference from their systems, sensible people with even the most rudimentary knowledge of radio frequency technology know that this is wishful thinking. Already as BPL field trials progress we are starting to see BPL proponents shift away from their absurd Lysenkoistic position that BPL systems will not cause interference as evidence mounts that these systems radiate and in many cases radiate very efficiently. While it is no surprise to people knowledgeable in the science of electromagnetics that these systems radiate, the collective denial of this potential problem by the BPL industry should be a cautionary tale for the commission. If this denial is any indication of the way in which BPL operators will approach interference complaints, then I think licensed incumbents are in for a rough time. It is for these reasons, and the unprecedented nature of BPL technology, that the commission needs to establish a strong regulatory framework, which will facilitate (and demand) efficient and quick resolution of the inevitable interference problems that will occur as BPL technology proliferates. I therefore concur strongly with Mr. Zitzelberger¹ and others that BPL equipment needs to be registered in a centralized and readily accessible public database.

B. Disclosure

3.) Most consumers are not technically savvy. When they purchase a data communication product or service they have every expectation that it will work

¹ Public comments of John Zitzelberger on FCC ET Docket 04-37 (May 3, 2004)

as advertised (and so they should). They therefore have every right to now that the technology they are acquiring can in some cases cause interference to licensed radio services and that in those instances they are legally obliged to cease operation of that equipment immediately. They also need to know that licensed radio services in the course of normal operation may cause interference to their equipment and that in those cases they have no legal recourse against the licensed service to cause them to cease and desist their lawful operation. I therefore strongly concur with Mr. Sutcliffe² who suggests that consumers need to be fully and strongly informed about the potential for both “interference from” and “interference to” their BPL equipment and that operation of BPL equipment is legally subordinate to that of incumbent licensed radio users.

C. Realities of Part 15

4.) In the paragraph 34 of the NPRM the commission states the following:

“ While we appreciate the interference concerns raised by existing radio users, we note that Access BPL will operate in compliance with the current Part 15 rules that limit emissions from unlicensed carrier current systems to very low power levels in comparison to licensed radio operations. We believe that the current Part 15 levels will limit the harmful interference potential of Access BPL devices to relatively short distances around these devices. In this regard, we note that hundreds of kinds of unlicensed devices are successfully operating under the current Part 15 limits without causing harmful interference to licensed operations. Furthermore, all unlicensed devices operating under Part 15 are subject to the condition that they not cause harmful interference and that they cease operation if they do cause such interference?”³

² Public comments of Gary C. Sutcliffe on FCC ET Docket 04-37 (April 30, 2004)

³ FCC Notice of Proposed Rulemaking ET Docket 04-37, page 15, ¶ 34

While it is true that as the commission states *“hundreds of kinds of part 15 devices are successfully operating without causing harmful interference to licensed radio services”*, it is disingenuous to compare the typical part 15 device with a BPL emitter. Unlike BPL equipment most part 15 devices are narrowband emitters. This makes it very unlikely that they will cause interference to a nearby licensed radio service. Those devices which are broadband in nature such as computers, TV monitors, and devices which employ high-speed digital electronics, lend themselves to shielding and other forms of EMC mitigation. These devices don't rely on conducted emissions over long spans of unshielded wire for proper operation. It is, in fact, the “wires” that are the distinguishing feature of BPL emitters. In the case of a BPL system, the level of radiated energy emanating from the power lines is inextricably linked by the laws of physics to the level of conducted energy intentionally impressed on those lines. One can only reduce the level of radiated energy by reducing the level of conducted energy, or by changing the structure of the transmission line.

5.) With regard to the interference potential of BPL systems, even if interference is limited to *“relatively short distances around these devices”* as the commission states, this will be little consolation to the licensed incumbent operating within the service area of a BPL system, since in these areas there will be many BPL devices which are a relatively short distance apart. The BPL system will in essence form a web of overlapping localized emitters. The

commission notes that *“BPL will operate in compliance with the current Part 15 rules that limit emissions from unlicensed carrier current systems to very low power levels in comparison to licensed radio operations”*. This statement ignores the “near-far” problem. Licensed radio services use high power levels because they are communicating over large distances. Their signals are therefore comparatively weak at the other end of the communications link. A very low power emitter in close proximity to a receiver can easily overwhelm a distant high power emitter. This is the crux of the BPL interference dilemma.

D. Point Source Emissions

6.) In paragraph 36 of the NPRM, the commission states the following:

“We also disagree with ARRL and others that suggest that interference caused to amateur and other radio operations by Access BPL systems complying with our Part 15 limits will be widespread. Although we agree with ARRL that Access BPL on overhead lines is not a traditional point-source emitter, we do not believe that Access BPL devices will cause the power lines to act as countless miles of transmission lines all radiating RF energy along their full length.”

“Rather, the primary source of emissions will be the individual couplers, repeaters and other devices and, to a lesser extent, the power line immediately adjacent thereto.”⁴

This statement is another example of the kind of Lysenkoistic thinking that has permeated the debate over this technology. While I am not surprised when BPL proponents make up their own laws of nature when it suits their agenda, I am shocked and saddened when a government regulatory agency engages in this kind of absurd chicanery. Ask any 10 year old child who has played with a

crystal radio and they will be able to tell you that it is that long wire, not the crystal set, that captures the signal. While it may be true in Washington D.C. that Maxwell's equations have been discarded and replaced by some revisionist theory of electromagnetics, I am not so sure that the electrons in our nations overhead powerlines have got the message. Small couplers and repeaters will radiate very little energy at HF frequencies. Long wires up in the air will. If not, then someone should contact the GAO and ask them to investigate why our military has been spending millions of dollars on tall towers and large antennas for their HF communication systems when they could achieve the same results with tiny little boxes.

E. Summary Remarks

7.) While I commend the commission's commitment to bringing low-cost high-speed internet access to all Americans, I must reiterate my deep concern that BPL technology will create a nightmare scenario for incumbent HF spectrum users unless the commission makes a strong and lasting commitment to swift enforcement of the part 15 rules. Without regulatory muscle, BPL providers will have little or no incentive to resolve interference complaints. With regard to the interference potential of BPL technology, they have already established a track record of denial and revisionist science. In drafting a regulatory framework for BPL technology, the commission needs to work under

⁴ FCC Notice of Proposed Rulemaking ET Docket 04-37, page 16, ¶ 36

the assumption that BPL will cause interference, and that this interference will be widespread. Technological solutions appear to be available which will help mitigate this interference, but technology alone will not get job done. Vigorous regulatory oversight is an absolute necessity.

Respectfully Submitted,

/s/

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